Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

1.92
Ag 82

JAN 19 19

AIC 217
December 10, 1948

SYNTHETIC FIBERS AND PAPER AS COMPETITORS OF COTTON[1]

by Robert B. Evans, Agricultural Economist
Southern Regional Research Laboratory[2]
New Orleans, Louisiana

For more than a century, cotton has been the South's dominant agricultural commodity. It has been the principal crop on 1,200,000 Southern farms, returning to farmers in 1947, a billion and a half dollars from the lint and an additional quarter of a billion dollars from the seed. This single crop was the source of more than half of the South's cash farm income in 1929, and one-third of the total in 1947. Except during the last three years when it has been outranked by wheat, cotton has been the most important cash crop of the entire United States.

This important farm industry today is in a very real fight for its existence. Cotton always has had plenty of competitors for consumers' markets, but in the past it has more than held its own. During the last few years, however, two competitors--synthetic fibers and paper--have been making particularly successful attacks upon cotton's end-use markets. The full effect of this competition has not been felt, thus far, because of the huge unprecedented demand, as a result of the war, for all sorts of textiles. But now that we are returning to a buyers' market, the story may be different.

Trends in Consumption

The great bulk of cotton's use is, of course, in the textile field. My first table 3/ shows trends in the consumption of the various textile fibers in the united States during the last half century. Note first the figures for total consumption of all textile fibers. This increased rapidly until about the time of World War I; then the trend leveled off and was only slightly upward during the 1920-1940 period. With World War II, however, our total consumption of fibers jumped abruptly to an all-time high. Although it is now declining, it still is substantially higher than prewar.

There is an important point about this trend that I would like to emphasize. During the long period from 1905 to 1939, our total consumption of fibers increased at about the same rate as our population. In other words, our per capita consumption of fibers failed to increase during these years. We each used 41 pounds of textile fibers, if we were alive back in 1904, and we still were using just 41 pounds of these fibers in 1939. But during World War II this figure jumped to more than 55 pounds; and, although it was down to 48 pounds during 1947, this total was still far larger than at any time before the war.

1/ For presentation before Southwest Regional Meeting, American Chemical Society, Shreveport, Louisiana, December 10th and 11th.
2/ One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.
3/ See appendix.

I am not going to risk a prediction as to what quantity of textile fibers we will use in the future. I can point out, however, that the population of the United States is growing pretty rapidly—12 percent more people now need clothing and other fiber products than in 1939. On the basis of past experience, we can expect that the total market for textiles will be at least 12 percent greater than prewar—and still greater if we continue to have the present rate of industrial and business activity.

Before leaving this first table, I should like to point out comparative trends in the consumption of the various textiles fibers. Cotton consumption closely parallels total consumption of all fibers, of which it is by far the most important component. Jute, which is used mainly for burlap bags and bagging has usually been the second most important fiber in poundage. Its consumption has been down somewhat during the last few years from what it was before the war. Practically all the jute we use is imported from India, and our supply has been affected by the recent troubles in that area. Wool consumption, as you can see, was at an all-time peak in 1946, higher even than during the war. Total consumption of the hard fibers, including Manila hemp, sisal, and similar fibers, used mainly for cordage and binder twine, is currently no larger than during 1915-19. Here again we have had difficulty getting an adequate supply because of the wartime destruction of hard fiber plantations in the Philippines and the Dutch East Indies. Notice that consumption of silk climbed steadily to a peak in 1929, after which competition from rayon began to affect it in woven goods. Consumption stayed quite high until 1940, because women liked silk hosiery so well, but nylon was rapidly taking over this end use when imports of silk from Japan stopped altogether in 1941. Consumption of flax, used for tablecloths, napkins, towels, and men's summer suits, has been following a downward trend since 1910. Most of the world's flax growing areas are now under Russian domination.

Two trends stand out in this table, the one for rayon and the one for other synthetics. The rayon industry is one of America's greatest success stories. Production started back in 1911 and there have been very few years since that time which have not shown a large gain over the previous year. The greatest advance in rayon consumption has been during the last few years, with consumption increasing from the equivalent of 1.1 million bales of cotton in 1939 to the equivalent of 2.8 million bales in 1948. Production of other synthetic fibers did not begin until the late 1930's. Fibers in this group now in commercial production include nylon, glass fiber, Vinyon, Saran, and until this year, casein fiber.

Cotton's Dominance

But let me go on. Table 2 shows cotton's dominant position in textile markets. Cotton is to textiles what iron is to metals. That cotton is still used in the United States more than all of the other fibers combined—as it has been for at least 50 years—is highly significant. How has cotton been able to maintain such a position? I should like to stress the answer: Markets go to the product which gives the consumer the most for his money. Cotton's strong hold on textile markets has been due to its having an excellent combination of properties, plus the fact that it has been available at prices which have made it the world's best buy as a textile raw material.

Although we are now consuming more cotton than before the war, it is well known that during the last few years cotton has been losing important markets to rayon and paper. It faces the prospect of greatly intensified competition from them in the future. Cotton also faces competition from nylon and the other new man-made fibers which only now are beginning to be produced in quantity. I shall attempt to relate why each of these materials is a very serious competitor of cotton.

Competition from Rayon

My first table showed how consumption of rayon has been rapidly rising. Rayon consumption in October 1948 was equivalent to 28 percent of cotton consumption, on a net, usable fiber basis. What has been the cause of this tremendous expansion? It has been due largely, first, to a steady improvement in quality; and second, to a downward trend in prices.

Improvements in quality. Taking the first of these factors, improvement in quality, rayon has been improved during the last 15 years in appearance, drape, softness, wrinkle resistance, color fastness, and washability, to name only some of the improved characteristics. Two specific developments, however, are directly associated with three-fourths of the large production increase since 1939—first, rayon staple fiber; and second, high-tenacity rayon.

Until about 1936, practically all rayon was in continuous filament yarn form, similar to silk. Then rayon staple fiber, or rayon cut into short fibers, entered the picture and ever since has been increasing rapidly in importance. This development had a dual effect: It opened the door to the vast cotton spinning industry as a potential consumer of rayon and, at the same time, offered this industry something it had never had before, an alternative to cotton as a raw material. By using rayon staple it is possible to make entirely different types of fabrics than can be made from continuous rayon yarn—fabrics that frequently resemble very closely standard cotton and wool constructions. This year, consumption of rayon staple in the United States—most of it consumed in cotton system mills—totaled the equivalent of close to 700,000 bales of cotton.

Poor strength was one of the difficult problems that the rayon industry had to conquer to make rayon a usable fiber. By 1937, thanks to continued research, rayon had enough strength for many clothing and household uses. It was still barred, however, from many industrial and other uses dominated by cotton, where high strength is important. About this time, the rayon companies introduced "high-tenacity" rayon, a type 80 percent stronger than the ordinary viscose type used in clothing. This new type of rayon makes possible cords and fabrics equal or superior in dry strength to cotton cords and fabrics. Production of high-tenacity rayon was expanded tremendously during the war for use in tires, and by 1947 totaled the equivalent of more than half a million bales. Only lately has the rayon industry begun to exploit the possibilities of this type of rayon for other purposes.

Improvements such as those I have just mentioned have placed rayon on a quality par with cotton in some uses and have given it an actual advantage over cotton in certain others. Cotton still has important advantages over

rayon generally in such properties as durability, wet strength, launderability, and resistance to seam slippage, and also has important advantages over some types of rayon in such properties as resistance to sunlight, resistance to heat, dry strength, and abrasion resistance. Looking to the future, however, and considering the amount of research being done on rayon, it can be expected that rayon will continue to make progress in the improvement of its properties, and will become technologically suited for more and more textile requirements.

Price trends. As I mentioned earlier, price is another highly important factor in the competition between rayon and cotton. From 1920 until about 1938, the history of rayon was one of continued reductions in price. Table 3 shows prices of viscose rayon staple fiber and of raw cotton since 1940. Notice that cotton had a tremendous advantage in price over rayon at the beginning of World War II. But this situation changed rapidly during the next few years, and from 1945 until the fall of 1948, cotton was actually priced higher than viscose rayon staple, on a net, "delivered-at-mill" basis. Currently, however, the two are priced about the same, because of the recent drop in cotton prices, and because of four increases in rayon prices since the end of the war.

Of tremendous importance to cotton growers and everyone else interested in cotton are such questions as: "What kind of rayon prices can be expected in the future?" "Will rayon prices decline?" "If so, how much?" To see whether we could arrive at the answers to these questions, we made a fairly detailed study of rayon costs, profits, and prices at the Southern Regional Research Laboratory. Here is the way it seems to us:

The rayon industry has been making substantial profits and is an industry that is constantly finding new ways to do things more efficiently. It, nevertheless, has had its share of postwar inflation in its cost of doing business. The cost of building a new rayon plant is now twice as great as before the war. The average wage rate in the industry is about $1.45 per hour as compared with 65 cents per hour during 1939, and the cost of wood pulp and chemicals per pound of rayon is now over 14 cents per pound as compared with 8.6 cents in 1940. A pound of viscose rayon staple fiber, which cost about 19 cents to make before the war and sold for 25 cents, now costs about 29 cents and sells for 37 cents. From these and other data, I believe we can conclude that it would be difficult for the rayon industry to make more than small reductions in prices. Even if there were a substantial decline in business activity, it would be hard to visualize rayon prices dropping more than a few cents per pound because of the stability to be expected in overhead costs and in the cost of chemicals, and the fact that labor organizations in the industry could be expected to oppose wage cuts.

Rayon's inroads into cotton markets. As rayon's quality and price position has improved, rayon has been able to expand into more and more textile markets. Consumption in women's clothing, always rayon's most important end use, has continued to increase, and in addition rayon has made considerable headway in men's suit linings, summer suits, sport shirts, and slacks. Before World War II, hardly any rayon was used for industrial purposes; but it is now used in large quantities in tire fabrics. Table 4 shows how production of rayon tire fabric increased from

9 million pounds in 1939 to 230 million pounds in 1947, comprising 40 percent of all tire fabric purchased during that year.

This invasion of rayon into the tire fabric market is of tremendous concern to the cotton industry. Before the war, all tire fabric was made of cotton. Tire fabric still requires 800,000 bales of cotton annually, amounting to more cotton than is being grown this year in the entire state of Louisiana or in Georgia. But the alarming aspect of the inroads of rayon, from the viewpoint of the cotton producer, is again the price relationship. At present rayon tire fabric is priced substantially lower per yard than cotton fabric. In addition, manufacturers say that although in passenger car tires there is little, if any, quality difference between cotton and rayon, in truck tires rayon gives better service than present commercial cotton fabrics. With this situation, tire manufacturers are using all the rayon they can get. Of course, in addition, because of the huge demand for tires, they are finding it necessary to use record-breaking quantities of cotton tire fabric.

The rayon industry. In concluding on rayon, I should like to point out that cotton growers, when they compete with rayon, are in competition with some of the best known, most successful American corporations, including E. I. du Pont de Nemours and Co., Eastman Kodak Co., American Viscose Corp., and Celanese Corp. of America. All of these concerns have excellent research staffs with the rayon industry as a whole spending around 1.7 percent of their sales income, or, on the basis of 1947 sales, around 10 million dollars annually on research. In addition, some of the rayon companies benefit from research on rayon in foreign countries through technical exchange agreements. Rayon firms also engage extensively in advertising, quality control programs, publicity and education, technical and promotional assistance to customers, and other merchandising activities. The individual cotton grower obviously will be no match for such competitors unless he unites with hundreds of thousands of other growers in an industry-wide program to back his product.

Synthetic Fibers Other Than Rayon

Until about 1935, rayon was the only manufactured fiber in commercial production in the United States. Since that time, several other synthetic fibers have been introduced commercially, and still others are in a pilot-plant stage of development. Going back to my first table, you can see that this new group is making considerable headway. Combined consumption rose from 4.5 million pounds in 1940 to 53 million pounds in 1946; then dropped slightly to 50 million pounds last year. Although this figure is the equivalent only of about 115,000 bales of cotton, it is already greatly in excess of the consumption of silk or flax in this country.

Nylon. Nylon holds first place among the new synthetic fibers, accounting for more than half of the combined production. Nylon was introduced by DuPont back in 1938 following many years of research. Its high strength and elasticity led to its first large use, in women's hosiery, where its success has become almost a legend. The entire production was diverted to wartime purposes during the war, but at present, most nylon is back in hosiery again, with smaller quantities going into a wide variety of textiles, including window curtains, airplane tires, thread, and fishing

lines. Currently, nylon yarn also appears to be making considerable headway in women's tricot knit underwear, a field now dominated by rayon. Recently, nylon staple fiber has been placed on the market for large-scale experimentation, and is being used in knitting yarns for hosiery and sweaters, in automobile upholstery, blankets, carpets, and other uses.

Nylon prices have been reduced substantially since its introduction, but they remain higher than comparable prices for cotton and rayon. For instance, nylon staple currently is quoted at $1.65 per pound. I have read that DuPont considers it unlikely that nylon will ever be priced as low as rayon. If this is the case, nylon's future markets can be expected to be in those fields where its superior strength, elasticity, and abrasion resistance are so important as to warrant the higher price charged for it. It is unlikely that nylon will become as important a competitor of cotton as rayon, as long as anywhere near present price relationships continue, although already nylon is replacing cotton in some end uses.

Others. Besides nylon, the new synthetic group includes Vinyon and Saran, both made of synthetic resins, protein fiber, and glass fiber. Vinyon and Saran are highly resistant to water absorption and to all but a very few chemicals. They are used for filter cloths, window screens, cordage, seating materials, and similar purposes. Saran staple, recently placed on the market, sells for $1.25 per pound, and Vinyon staple for $1.00.

Another synthetic fiber, casein fiber, was manufactured in the United States from 1939 until 1948, when the plant was sold to another concern which began commercial production of a vegetable protein fiber, probably made of zein or corn protein, last May. This fiber has softness and resilience; but its wet strength, important in laundering and for outdoor clothing, is quite low. It probably will be used mainly in blends with other fibers for clothing. It currently sells for $1.00 per pound.

Glass fiber is the oldest of the group of new synthetic fibers of which I am speaking. Although glass fiber is fireproof and has unusually high strength, it lacks resiliency and ability to stretch. It is used in glass fabrics for insulating motors and other electrical equipment, for filters, and in laminated plastics, coming into direct competition with cotton in the latter use. Recently glass fiber yarns have been coated with resins to improve their resistance to abrasion, and they are being tried for seat covers, awnings, and automobile tops. Although glass fiber is used for draperies and other decorative purposes where it is not subject to flexing, it definitely is not suitable for clothing and many other textile uses.

In summary, synthetic fibers other than rayon are as yet in their infancy. Like rayon, they are products of research, sponsored among others by such concerns as Dow Chemical Co., DuPont, Carbide and Carbon Chemical Corporation, and Virginia-Carolina Chemical Corporation. Some of the new fibers have characteristics which seem to promise a bright future in textiles, while others appear to be suitable only for specialty uses. Although it appears that these fibers will continue to be priced much higher than cotton, a tremendous amount of research and developmental work, in the aggregate, is being spent on them, and it can be expected that their quality-price position will improve. It is only reasonable to believe that they will make a stronger and stronger bid for textile markets in the years to come. It can also be expected that additional synthetic fibers will appear.

Paper as a Competitor of Cotton

And now I have one more highly important competitor of cotton to discuss: that is, paper. Less than 10 percent of the total paper consumed in the United States is used for products which compete directly with cotton. Paper, nevertheless, has been an agressive competitor of cotton in recent years. Competition has been particularly severe in such products as bags, towels, handkerchiefs, napkins, window shades, plastics, and twine, products which normally account for about 1 million bales of cotton annually. Even draperies made of paper are now being extensively sold, taking the place of those made of cotton and other fibers.

Cotton probably has been displaced by paper to a greater extent in bags than in any other use. Bags, I might mention, are usually cotton's second most important use, but for a time during World War II they were in first place. Table 5 shows how cotton has been faring in bags as compared with paper and burlap. Consumption of cotton in bags increased from 505,000 bales in 1939 to an all-time peak of 820,000 bales in 1943, owing to wartime demand and an acute shortage of burlap. But since then, consumption has declined to 448,000 bales in 1947, despite an increased total market for bags. In contrast, production of shipping sack paper has been climbing steadily for several years. During the last few years, there has been considerable displacement of cotton by paper for packaging such commodities as sugar, cement, and fertilizer. At present, a concerted campaign is underway to displace cotton bags for flour.

Over the years, paper bags have become better and better adapted to users' requirements as a result of an aggressive research program. In addition, much of their progress in recent years has been due to their price advantage over cotton bags, an advantage which increased tremendously during the war, as indicated by table 6. Just the same, prices do not tell the entire story. The net cost of using cotton bags frequently is lower than for using paper bags. Paper bags usually are nearly worthless after being used once, while cotton bags frequently are used several times or may eventually wind up as someone's house dress. In fact, use of cotton bags is now largely restricted to markets where re-use and salvage values are important. In order to maintain cotton's important market in bags, the National Cotton Council and the Textile Bag Manufacturers Association at present are conducting an extensive advertising campaign to make the public aware of the second-hand value of these bags.

How Cotton Can Meet Its Competition

It is obvious, I believe, from some of the facts I have mentioned, that cotton must battle to maintain its markets. This raises two questions: First, is there hope for cotton's future in the face of increasing competition from other materials? Second, what can be done to improve cotton's competitive status? We have an answer to the second question that, I believe, will affirmatively answer the first.

First of all, I should like to remind you that the cotton industry is now well into its greatest revolution since the invention of the cotton gin. Mechanized cotton production, together with the greatly increased yields which farmers are securing per acre, means that cotton will be produced at a much lower cost in terms of human effort in the future than it has

in the past. In fact, it appears that cotton can be grown at a far lower cost than seems to be possible, at least yet, for the production of any man-made fiber. For most textile markets, as I have brought out, price is a factor of great importance. It is extremely significant, then, that it appears that the cotton industry will be able to undersell its synthetic competitors if it is willing to do so. At the same time, the cotton industry should be able to narrow the present margin between the net cost of using cotton and paper products, although unquestionably paper products will continue to be lower in first price.

A second promising factor in cotton's battle to maintain its markets has to do with the improvements being made in its quality. As I said earlier, some of cotton's advantages in quality already have been equalled by competitive materials, while others are under constant attack in the research laboratory. Research, however, can be applied to improve the quality of cotton products as well as to better the market position of its competitors. Dr. Walter M. Scott has just given you numerous examples of what is being done along these lines. The cotton industry today is acutely aware that research expenditures on behalf of rayon are much greater than those on cotton, despite cotton's vastly greater quantitative and dollarwise importance. It is taking steps to change this situation. Researchers in the field are confident that there are vast opportunities for productive research on cotton. Again I refer to Dr. Scott's resume' of recent developments.

A third point has to do with marchandising. Here again cotton's competitors have stolen the spotlight in years past, and here again an aroused cotton industry is doing something about it. Witness the high-style cotton fabrics now being pictured on the pages of America's fashion magazines, the placards in street cars and subways reminding the reader of the social value of "cotton freshness", and the appearance of cotton flour bags and feed bags printed in designs that make them easily convertible into colorful house dresses.

In summary, a real battle is going on between cotton and its competitors, but it is a battle that cotton is not going to lose by default.

Table 1.- Average estimated quantities of fibers made available for use annually by ultimate consumers 1/ in the United States during designated periods, 1892-1944 and annual totals for 1940-46.

Period 2/	Cotton	Wool 3/	Silk	Flax	Rayon	Other synthetic fibers 4/	Sub-total	Jute	Hard fibers 5/	Hemp	Grand total
	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds	Million pounds
1892-94	1,176	254	12	39			1,481	304	228	19	2,032
1895-99	1,429	287	15	43			1,774	412	246	22	2,454
1900-04	1,801	240	21	50			2,112	524	324	20	2,980
1905-09	2,239	276	26	55			2,596	647	338	23	3,604
1910-14	2,373	318	35	71	3		2,800	712	412	24	3,948
1915-19	2,864	404	50	41	7		3,366	671	512	25	4,574
1920-24	2,691	418	60	39	26		3,234	776	413	16	4,439
1925-29	3,091	406	90	49	91		3,727	912	456	8	5,103
1930-34	2,566	302	78	39	169		3,154	649	382	3	4,188
1935-39	3,203	417	65	41	331		4,057	775	453	3	5,288
1940-44	4,754	602	14	21	596	25	6,012	613	552	45	7,222
1940	3,837	443	48	25	471	4	4,828	667	514	2	6,011
1941	4,947	692	25	20	571	12	6,267	796	754	10	7,827
1942	5,420	645	6/	31	607	24	6,727	426	492	19	7,664
1943	5,049	631	6/	17	644	37	6,378	617	496	141	7,632
1944	4,516	600	6/	12	687	46	5,861	560	511	52	6,984
1945	4,303	644	2	14	744	49	5,756	538	514	7	6,815
1946	4,492	735	16	31	829	53	6,156	759	419	5	7,339
1947	4,049	702	4	19	892	50	5,716	688	523	5	6,932

1/ Consumption of raw fiber plus additions and minus subtractions for imports and exports of fiber manufactures.
2/ Fiscal years ending June 30, 1892-1917, except for cotton which is given for years ending August 31, 1892-1913 and rayon which is given for calendar years, 1911-17; calendar years, 1918-47.
3/ Wool and similar fibers including mohair, camels hair, etc. Scoured equivalent weights.
4/ Includes nylon, Aralac, Saran, Vinyon, and Fiberglas. Consumption before 1940 was inconsequential.
5/ Including abaca (Manila fiber), sisal, henequen, istle (Tampico fiber), phormium (New Zealand hemp), and cantala. Includes also sunn, a soft fiber used for same purposes generally as hard fibers.
6/ Less than 500,000 pounds. 7/ Preliminary.

Table 2.- Fibers made available for use by ultimate consumers in the United States during designated periods, 1892-1947, in percentages of the total 1/

Period 2/	Cotton	Wool	Silk	Flax	Rayon	Other synthetic fibers	Sub-total	Jute	Hard fibers	Hemp	Total all fibers
	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent
1892-94	57.9	12.5	0.6	1.9			72.9	15.0	11.2	0.9	100.0
1895-99	58.2	11.7	0.6	1.8			72.3	16.8	10.0	0.9	100.0
1900-04	60.4	8.1	0.7	1.7			70.9	17.6	10.9	0.6	100.0
1905-09	62.1	7.7	0.7	1.5			72.0	18.0	9.4	0.6	100.0
1910-14	60.1	8.1	0.9	1.8	0.1		71.0	18.0	10.4	0.6	100.0
1915-19	62.6	8.8	1.1	0.9	0.2		73.6	14.7	11.2	0.5	100.0
1920-24	60.6	9.4	1.4	0.9	0.6		72.9	17.5	9.3	0.3	100.0
1925-29	60.6	8.0	1.7	0.9	1.8		73.0	17.9	8.9	0.2	100.0
1930-34	61.3	7.2	1.9	0.9	4.0		75.3	15.5	9.1	0.1	100.0
1935-39	60.6	7.9	1.2	0.8	6.2		76.7	14.6	8.6	0.1	100.0
1940-44	65.8	8.3	0.2	0.3	8.2	0.4	83.2	8.6	7.6	0.6	100.0
1940	63.8	7.4	0.8	0.4	7.8	0.1	80.3	11.1	8.6	3/	100.0
1941	63.2	8.8	0.3	0.3	7.3	0.2	80.1	10.2	9.6	0.1	100.0
1942	70.8	8.4	3/	0.4	7.9	0.3	87.8	5.6	6.4	0.2	100.0
1943	66.2	8.3	3/	0.2	8.4	0.5	83.6	8.1	6.5	1.8	100.0
1944	64.7	8.6	3/	0.2	9.8	0.7	84.0	8.0	7.3	0.7	100.0
1945	63.1	9.5	3/	0.2	10.9	0.7	84.4	7.9	7.6	0.1	100.0
1946	61.2	10.0	0.2	0.4	11.3	0.7	83.8	10.4	5.7	0.1	100.0
1947	58.4	10.1	0.1	0.3	12.9	0.7	82.5	9.9	7.5	0.1	100.0

1/ Based on table 1.
2/ Calendar years, 1918-47; fiscal years ending June 30, 1892-1917, except for cotton which is given for years ending August 31, 1892-1913, and rayon which is given for calendar years, 1911-17.
3/ Less than .05 percent.
4/ Preliminary.

Table 3.- Comparative prices of cotton viscose rayon staple, and acetate rayon staple, 1940-1948

Year	Cotton (M-1.5/16)		Viscose rayon staple 3/	Acetate rayon staple 4/
	10-market quotation 1/	Price comparable to rayon 2/		
	Cents	Cents	Cents	Cents
1940, average	10.17	12.5	25	43
1945, average	22.62	26.7-	25	38
1946, average	30.56	35.8	25	44
1947, average	34.43	40.5	32	48
1948, January	35.15	41.0	36	48
1948, April	37.22	43.2	36	48
1948, July	34.01	40.0	36	48
1948, October	31.24	36.7	37	48

1/ Compiled from reports of Production and Marketing Administration, U.S. Department of Agriculture.
2/ Delivered-at-mill cotton quotations divided by .89 to allow for differences in tare and net waste as compared with rayon.
3/ Bright luster, regular tenacity, all lengths. From Rayon Organon.
4/ All lengths, bright and dull, 8 denier or finer. From Rayon Organon.

Table 4.- Production of cotton and rayon tire cord and fabric in the United States, 1939-1947

Year	Quantities			Percentages		
	Rayon	Cotton	Total	Rayon	Cotton	Total
	Million pounds	Million pounds	Million pounds	Percent	Percent	Percent
1939	9 1/	260	269	3	97	100
1942	28	223	251	11	89	100
1943	44	238	282	16	84	100
1944	94	265	359	26	74	100
1945	181 2/	282	463	39	61	100
1946	212 2/	311	523	41	59	100
1947	230 2/	345	575	40	60	100

1/ Shipments of rayon yarn to tire manufacturers. From Rayon Organon.
2/ Includes small quantity of nylon.

Table 5.- Quantities of cotton fabric, burlap, and shipping sack paper used in bags in the United States, 1939-1947 and cotton equivalents

Year	Quantities 1/						Cotton equivalents 2/		
	Cotton fabric	Burlap	Paper	Cotton fabric	Burlap	Paper	Cotton fabric	Burlap	Paper
	Million yards	Million yards	1,000 tons	Index	Index	Index	1,000 bales	1,000 bales	1,000 bales
1939	816	712	201	100	100	100	505	451	392
1940	890	648	195	109	91	97	548	410	380
1941	927	620	270	114	87	134	573	392	526
1942	1,183	306	251	145	43	125	728	194	489
1943	1,283	373	315	157	52	157	820	236	614
1944	1,052	609	392	129	86	195	662	385	764
1945	938	819	424	115	115	211	588	518	827
1946	760	940	550	93	132	274	476	595	1,073
1947 3/	714	831	570	88	117	284	448	526	1,111

1/ Cotton fabric and burlap totals are estimates of the Textile Bag Manufacturers' Association. Paper totals are quantities of shipping sack paper manufactured as compiled by the Bureau of the Census except for 1939 and 1940, which are estimated consumption figures compiled by the War Production Board, and for 1946, which is estimate of Paper Shipping sack Manufacturers' Association.

2/ Cotton equivalents of cotton fabrics have been calculated on the basis of bag constructions most generally used, allowing for non-cotton content and waste. For burlap and paper, estimates are on basis of replacement of bags made of these materials by cotton bags now used for same commodities or by typical cotton bags. Bales are 478 pounds net.

3/ Preliminary.

Table 6.- Comparative prices of cotton, burlap, and paper flour bags, per thousand, 1940-48

Year	Cotton 1/	Burlap 2/	Paper 3/
	Dollars	Dollars	Dollars
1940, average	87.38	94.81	66.52
1945, average	168.67	149.85	87.40
1946, average	205.93	155.12	88.42
1947, average	300.70	256.98	99.69
1948, January	321.70	278.80	108.65
1948, April	277.75	215.00	108.65
1948, July	233.15	211.55	108.65
1948, October	238.00	240.85	114.05

1/ 100-lb. unbleached cotton flour bag, unprinted, 37" 4.00 sheeting cut 43", l.c.l. delivered St. Louis.

2/ 100-lb. burlap flour bag, 36" 10 oz. common burlap cut 43" unprinted, l.c.l. delivered St. Louis.

3/ 100-lb. sewn valve multiwall flour bag. 18 x 4½ x 36-3/4 or 17½ x 4½ x 37-3/4. Construction 3/40 1/50 plain bags with freight classification stamp only. Tuck in sleeve l.c.l. delivered St. Louis.